

List of GMI Namelist Variables

NASA Goddard Space Flight Center

SIVO/ASTG - Code 610.3

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Variable Name	Type	Default Value	Description
ESM SECTION			
problem_name	C*128	'gmi_test'	The name of the problem to be run.
timer_esm	I	0	Enables the timing routines for the esm; a value of 1 enables monitoring of the entire esm simulation.
NP_actm	I	0	A positive value enables the esm package "actm" and sets the number of processors for the actm package o NP_actm; to run Gem/Gmimod, NP_actm must always be set to ≥ 1 .
oneprCSR	I	0	A value of 1 turns the esm into a single processor code; the default is to run with master and slave processors. To run Gem/Gmimod, normally set tp 0 for parallel machines, and to 1 for non-parallel machines.
day0	I	0	The integer day of the year at time 0.
tbegin_days	R	0.0	The starting time of the esm simulation (days).
tfinal_days	R	0.0	The ending time of the esm simulation (days).
nlGmiControl SECTION			
do_ftiming	L	F	Do fine timing?
Processor distribution:			
NPI_actm	I	1	Number of processors in the i direction (longitude).
NPJ_actm	I	1	Number of processors in the j direction (latitude).
Global dimension info:			
gmi_nborder	I	4	Number of longitude and latitude ghost zones.
i1_gl	I	1	Index of first global longitude (no ghost zones).
i2_gl	I	72	Index of last global longitude (no ghost zones).
ju1_gl	I	0	Index of first global "u" latitude (no ghost zones).

jv1_gl	I	1	Index of first global "v" latitude (no ghost zones).
j2_gl	I	46	Index of last global "u&v" latitude (no ghost zones).
k1_gl	I	1	Index of first global altitude (no ghost zones).
k2_gl	I	29	Index of last global altitude (no ghost zones).
num_species	I	1	Number of species.
Time:			
leap_year_flag	I	0	Leap year flag: < 0: no year is a leap year = 0: leap years are determined normally > 0: every year is a leap year
start_hms	I	000000	Starting hour/min/sec (HHMMSS).
start_ymd	I	890101	Starting year/month/day (YYMMDD).
gmi_sec	R	0.0	Total Gmimod seconds (s).
tdt	R	180.0	Model time step (s).
Main transport option:			
trans_opt	I	1	Transport option: 1: do LLNLTRANS transport 2: do UCITRANS transport (non-parallel mode)
nlGmiMetFields SECTION			
General input data:			
gmi_data_dir	C*80	''	Directory where input files are located.
Met data:			
met_opt	I	3	Met input option: 1: use values fixed in code for u, v, ps, kel; no other data set 2: read in a minimal set of met data: u, v, ps, & kel; no other data set 3: read in a full set of met data.
met_grid_type	C	'A'	Met grid type: 'A': use A grid (DAO, NCAR(CCM)) 'C': use C grid (GISS)

mdt	R	21600.0	Time increment for reading new met data; must be a multiple of tdt (s).
do_cycle_met	L	F	When the last met input file has been read, should the code cycle back and continue with the first file again?
do_timinterp_met	L	T	Should the met fields, except the winds, be timeinterpolated?
do_timinterp_winds	L	T	Should the wind fields be time interpolated? Note that pressure fields are always interpolated.
do_wind_pole	L	F	When met_opt = 1, should the transport be over the poles or around the equator?
met_infile_num	I	1	Index of NetCDF file to start reading met input data from.
mrnum_in	I	1	NetCDF file record to start reading met data from.
tmet1	R	0.0	Time tag of the mrnum_in (s).
do_read_met_list	L	F	Should the met file names be read in from met_filnam_list?
met_filnam_list	C*80	'met_filnam_list.in'	Name of file to get names of met input files from. Note that currently this file must reside in the same directory that you are running the gem executable from.
met_infile_names()	C*128	''	An array of met input file names (list may be used instead).
gwet_opt	I	0	Option for choosing which gwet variable to read (for GEOS4) 0: Read gwet1 1: Read gwettop

nlGmiSpeciesConcentration SECTION

Base species concentration units = mixing ratio			
const_opt	I	2	Const input option: 1: set const values to const_init_val 2: read in const values 3: solid body rotation 4: dummy test pattern with linear slope in each dimension 5: exponential in vertical (decays with height) 6: sin in latitude (largest at equator)

			7: linear vertical gradient 8: sin in latitude (largest at equator) + vertical gradient
mw()	R	0.0	Array of species' molecular weights (g/mol).
const_init_val()	R	1.0d-30	When const_opt = 1, this array of values will be used to initialize each const species (note that if a negative const_init_val() marker is set in the namelist input file, all of the const_init_val's from negative value on will be set to the value preceding the negative value).
const_infile_name	C*128	''	Constituent input file name.
const_var_name	C*32	'const'	NetCDF constituent variable name.
const_labels()	C*24	''	Constituent string labels.
fixed_const_timpqr	I	12	Fixed const times per year: 1: one set of emissions per year (yearly) 12: twelve sets of emissions per year (monthly)
fixedConcentrationSpeciesNames	C*	"	List of fixed species concentration names as long string.
fixed_const_infile_name	C*128	''	Fixed const input file name.
io3_num	I	0	Index of ozone constituent.

nlGmiDiagnostics SECTION

ASCII output:

Terminal screen output:

pr_diag	L	F	Print some diagnostic output to screen?
pr_time	L	T	Should the time be printed to the terminal screen each time step (if false, will still get time output to the screen at the end of each day)?

Namelist file output:

pr_nl	L	F	Should all the namelist variables be written to a file (problem_name.nl)?
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Species/Mass ASCII file output:

pr_ascii	L	T	Should the ASCII output file be written at all?
pr_ascii1	L	T	Should the first section of the ASCII output file be written (the mass data)?
pr_ascii2	L	F	Should the second section of the ASCII output

			file be written (the species concentration data)?
pr_ascii3	L	T	Should the third section of the ASCII output file be written (the species concentration min/maxs)?
pr_ascii4	L	F	Should the fourth section of the ASCII output file be written (total mass of each species)?
pr_ascii5	L	F	Should the fifth section of the ASCII output file be written (total production and loss of each species)?
ascii_out_n	I	1	Single species index to use.
ascii_out_i	I	1	Longitude index to use in the second section.
pr_ascii_step_interval	I	1	Interval for ASCII output: > 0: ASCII output at specified step interval = -1: ASCII output at monthly intervals
SmgearII file output:			
pr_smv2	L	F	Should the SmgearII output file be written (non-parallel mode only)?
General NetCDF output:			
pr_ncdf	L	T	Should any of the periodic output files be written at all?
hdr_var_name	C*32	'hdr'	NetCDF header variable name.
hdf_dim_name	C*32	'hdf_dim'	NetCDF header dimension name.
lat_dim_name	C*32	'latitude_dim'	NetCDF latitude dimension name.
lon_dim_name	C*32	'longitude_dim'	NetCDF longitude dimension name.
prs_dim_name	C*32	'pressure_dim'	NetCDF pressure dimension name.
spc_dim_name	C*32	'species_dim'	NetCDF species dimension name.
rec_dim_name	C*32	'rec_dim'	NetCDF record dimension name.
tim_dim_name	C*32	'time_dim'	NetCDF time dimension name.
pr_level_all	L	T	Should output be done on all the vertical levels? If pr_level_all=F, then set k1r_gl and k2r_gl
k1r_gl	I	1	First altitude index for output ($k1r_{gl} \geq k1_{gl}$).
k2r_gl	I	29	Last altitude index for output ($k2r_{gl} \leq k2_{gl}$).
pr_const	L	T	Should the periodic species concentrations output file be written?
pr_psf	L	F	Should the surface pressures be written to the periodic const output file?

pr_kel	L	F	Should the temperatures be written to the periodic const output file?
pr_mass	L	F	Should the mass be written to the periodic const output file?
pr_grid_height	L	F	Should the grid box height be written to the periodic const output file?
pr_relHumidity	L	F	Should the rel humidity be written to the periodic const output file?
pr_metwater	L	F	Should the meteorological water be written to the periodic const output file?
pr_dry_depos	L	F	Should the dry depositions be written to the periodic const output file?
pr_wet_depos	L	F	Should the wet depositions be written to the periodic const output file?
pr_surf_emiss	L	F	Should the surface emissions be written to the periodic const output file?
pr_overheadO3col	L	F	Should overhead ozone column be written out?
pr_tropopausePress	L	F	Should tropopause pressure be written out?
pr_potentialVorticity	L	F	Should potential vorticity be written out?
pr_qj	L	F	Should the periodic qj output file be written?
pr_qj_o3_old	L	F	Should the special reaction O3→O1D be saved with the qj's?
pr_qj_opt_depth	L	F	Should the optical depth be saved with the qj's?
pr_qk	L	F	Should the periodic qk output file be written?
pr_qqjk	L	F	Should the periodic qqjk output file be written?
pr_sad	L	F	Should the periodic sad output file be written?
pr_tend	L	F	Should the periodic tendency diagnostics output file be written?
pr_const_all	L	T	Should all of the species concentrations be written to the periodic const output file?
pr_emiss_3d	L	F	Should 2d emissions be written to the periodic const output file?
pr_AerDust	L	F	Should the periodic aerosol/dust diagnostics be written?
do_aerocom	L	F	Should aerocom calculations be performed?
do_dust_emiss	L	F	
			> 0.0: periodic output at specified interval (days)

			-1.0: periodic output at monthly intervals -2.0: periodic output on 1st & 15th of each month
do_mean	L	F	Should means or current values be put in the periodic output files?
do_qqjk_inchem	L	F	If pr_qqjk is on, should qqj's & qk's be determined inside the chemistry outside?
concentrationSpeciesNames	C*	"	List of species names for species concentration diagnostic as a long string. Note that concentrationSpeciesNames is only used if pr_const_all is false. Note that concentrationSpeciesNames is also used to determine the species written to dry_depos and wet_depos.
pr_nc_period_days	R	1.0	NetCDF output period: > 0.0: periodic output at specified interval (days) -1.0: periodic output at monthly intervals -2.0: periodic output on 1st & 15th of each month
pr_emiss_all	L	T	Should all the surface emissions be written to the periodic const output file? If set to F and pr_surf_emiss=T, then specify surfEmissionSpeciesNames.
surfEmissionSpeciesNames	C*	"	List of species names for surface emission diagnostic as a long string.
pr_drydep_all	L	T	Should all the dry depositions be written to the periodic const output file? If set to F and pr_dry_depos=T, then specify dryDepSpeciesNames.
dryDepSpeciesNames	C*	"	List of species names for dry_dep diagnostic as a long string.
pr_wetdep_all	L	T	Should all the wet depositions be written to the periodic const output file? If set to F and pr_wet_depos=T, then specify wetDepSpeciesNames.
wetDepSpeciesNames	C*	"	List of species names for wet_dep diagnostic as a long string.
pr_tend_all	L	T	Should periodic tendency diagnostics output file be written for all the species? If set to F and pr_tend=T, then specify tendSpeciesNames.
tendSpeciesNames	C*	"	List of species names for tendencies diagnostic as a long string.
Flux Diagnostics:			
pr_flux	L	F	Should the periodic flux diagnostics file be written?

fluxSpeciesNames(1:n)	C*16	"	List of species names used for flux diagnostics.
pr_const_flux	L	T	Should the periodic species concentrations output file be written?
pr_psf_flux	L	F	Should the surface pressure be written out in the flux file?
flux_name	C*8	'mf'	NetCDF flux variable name.
pr_nc_period_flux	R	1.0	flux output period: > 0.0: periodic output at specified interval (days) -1.0: periodic output at monthly intervals -2.0: periodic output on 1st & 15th of each month
Local Species Output:			
pr_local	L	F	Should the periodic local variables be written out?
do_local_rate	L	F	Should rates and rate constants be locally averaged?
local_metwater	L	F	Should met. water be put out at local noon time.
pr_const_local	L	F	Should the periodic local species conc. be written for user defined species?
localSpeciesNames	C*	"	List species names for local diagnostics as a long string.
local_species_beg_time	R*8	11.d0	Beginning time for local_species species concentration.
local_species_end_time	R*8	13.d0	Ending time for local_species species concentration.
pr_const_column_local	L	F	Should the periodic species conc. column file be written?
pr_local_period_days	R	1.0	local netCDF output period: > 0.0: periodic output at specified interval (days) -1.0: periodic output at monthly intervals -2.0: periodic output on 1st & 15th of each month
Noon Species Output:			
noonSpeciesNames	C*	"	List species names for noon diagnostics as a long string.
noon_metwater	L	F	Should the metwater be calculated at local noon?
pr_psf_noon	L	F	Should surf. press. be written to periodic noon species output file?
pr_kel_noon	L	F	Should temp. be written to the periodic noon species output file?
do_noon_rate	L	F	Should photolysis rate constants be calculated at local Noon?
noon_species_beg_time	R*8	11.d0	Beginning time for noon_species species concentration.
noon_species_end_time	R*8	13.d0	Ending time for noon_species species concentration.

Overpass Output (# is 1, or 2):			
pr_overpass#	L	F	Should the periodic overpass# output file be written?
overpass#SpeciesNames	C*	"	List species names for overpass# diagnostics as a long string.
pr_const_overpass#	L	F	Should the periodic species conc. be written for user defined species?
pr_psf_overpass#	L	F	Should surface pressure be written out?
pr_kel_overpass#	L	F	Should temperature be written out?
pr_qj_overpass#	L	F	Should photolysis rates be written out?
pr_qqjk_overpass#	L	F	Should photolysis rate constants be written out?
pr_metwater_overpass#	L	F	Should metwater be written out?
pr_totalMass_overpass#	L	F	Should mass be written out?
pr_relHumidity_overpass#	L	F	Should relative humidity be written out?
pr_gridBoxHeight_overpass#	L	F	Should grid box height be written out?
pr_cloudOptDepth_overpass#	L	F	Should cloud optical depth be written out?
pr_tropopausePress_overpass#	L	F	Should tropopause pressure be written out?
pr_overheadO3col_overpass#	L	F	Should overhead ozone column be written out?
begTime_overpass#	R	11.0	Beginning time for overpass#
endTime_overpass#	R	13.0	Ending time for overpass#
pr_overpass#_period_days	R	1.0	overpass netCDF output period: > 0.0: periodic output at specified interval (days) -1.0: periodic output at monthly intervals -2.0: periodic output on 1st & 15th of each month
Frequency Output (# is 1, 2, 3, or 4):			
pr_const_column_freq#	L	F	Should the periodic species conc. column file be written?
pr_const_surface_freq#	L	F	Should the periodic surf. species conc. file be written?
k1_freq#	I	k1	Minimum level for freq# output variables.
k2_freq#	I	k2	Maximum level for freq# output variables.
do_mean_freq#	L	F	
do_day1_freq#	L	F	
pr_freq#	L	F	Should the periodic output file at Frequency # be written?

pr_const_freq#	L	F	Should the periodic species conc. be written for user defined species?
pr_psf_freq#	L	F	Should surface pressure be written out?
pr_kel_freq#	L	F	Should temperature be written out?
pr_mass_freq#	L	F	Should mass be written out?
pr_rel_hum_freq#	L	F	Should relative humidity be written out?
pr_grid_height_freq#	L	F	Should grid box height be written out?
pr_overheadO3col_freq#	L	F	Should overhead ozone column be written out?
pr_potentialVorticity_freq#	L	F	Should potential vorticity be written out?
pr_tropopausePress_freq#	L	F	Should tropopause pressure pressure be written out?
pr_nc_freq#	R	1.0	
freq#SpeciesNames	C*	"	List species names for freq# diagnostics as a long string.
freq#_name	C*80	', '	
freq#_description	C*80	', '	Description to be included in the header of the nc file.

Column diagnostic NetCDF output:

stationsInputFileName	C*128	"	File having a list of all possible stations (with their locations) for column diagnostics.
col_diag_period	R	3600.0	Column diagnostics output period (s).
colDiagStationsNames	C*	', '	List of selected stations (as a long string) for column diag.
colDiagSpeciesNames	C*	"	List of species names for column diagnostics as a long string.
col_diag_pres(1:10)	R	1000.0, 900.0, ... , 100.0	Pressure levels for column diag. (mb).

nlGmiRestart SECTION

pr_restart	L	F	Should a restart file be written?
do_overwrt_RST	L	T	Should the restart file be over-written?
pr_RST_period_days	R	7.0	Restart output period: > 0.0: restart output at specified interval (days) -1.0: restart output at monthly intervals -2.0: restart output on 1st & 15th of each month
rd_restart	L	F	Should a restart file be read?
restart_infile_name	C*128	'gmi.rst.nc'	Name of restart input file; note that currently this file must reside in the

			same directory that you are running the gem executable from.
restart_inrec	I	last record # in rst file	Record number in restart (rst) input file to read from.
nlGmiAdvection SECTION			
advec_opt	I	1	Advection option: 0: no advection 1: do DAO2 advection
press_fix_opt	I	1	Pressure fixer option: 0: no pressure fixer used 1: LLNL pressure fixer used (Cameron-Smith) 2: UCI pressure fixer used (Prather)
pmet2_opt	I	1	pmet2 option: 0: use pmet2 1: use (pmet2 - "global mean change in surface pressure")
advec_consrv_opt	I	2	Advection conserve option: 0: conserve tracer conc.; use pmet2 1: conserve tracer mass; use pmet2 2: conserve both tracer conc. & mass; use pctm2 Note that if press_fix_opt = 0 & advec_consrv_opt = 2, the code will generate an error and exit.
advec_flag_default	I	1	Set all species to do advection or not to do advection as the default; can then use advec_flag turn individual species either off, if the default is on; or on, if the default is off: 0: do not advect any species as default 1: advect all species as default
advectedSpeciesNames	C*	"	List of advected species names as a long string. Set advec_flag_default = 1 to use this variable.
j1p	I	3	Determines size of the Polar cap; j2p = j2_gl - j1p + 1
do_grav_set	L	F	Should gravitational settling of aerosols be done?
do_var_adv_tstp	L	F	Should variable advection time steps be taken as

			determined by the Courant condition?
nlGmiConvection SECTION			
Base convection units = kg/m²*s			
convec_opt	I	0	Convection option: 0: no convection 1: do DAO2 convection 2: do NCAR convection
nlGmiDeposition SECTION			
Base deposition units = m/s			
do_drydep	L	F	Should dry deposition be done?
do_wetdep	L	F	Should wet deposition be done?
do_simpledep	L	F	Should simple deposition be done?
num_ks_sdep	I	1	Number of vertical layers to apply 2 day loss factor to in simple deposition.
wetdep_eff()	R	0.0	Wet deposition (scavenging) efficiencies; should be set to values between 0.0 and 1.0 for each species.
nlGmiDiffusion SECTION			
diffu_opt	I	0	Diffusion option: 0: no diffusion 1: do DAO2 vertical diffusion
vert_diffu_coef	R	0.0	Scalar vertical diffusion coefficient (m ² /s).
nlGmiEmission SECTION			
Base emissions units = kg/s			
emiss_opt	I	0	Emissions option: 0: no emissions 1: do LLNL emissions only 2: do LLNL + Harvard emissions
emiss_in_opt	I	0	Emissions input option: 0: no emissions data

			1: set all emiss values to emiss_init_val 2: read in emiss values
emiss_conv_flag	I	0	Emissions conversion flag: 0: no conversion performed 1: use scalar emiss_conv_fac (scalar * kg/s => kg/s) 2: use calculated emissions conversion factor (kg/km ² *hr => kg/s)
semis_inchem_flag	I	-1	Surface emissions inside chemistry flag: < 0: If emissions are on, surface emissions will be done in Smvgear chemistry if it is on; outside of chemistry if Smvgear chemistry is off. = 0: If emissions are on, surface emissions will be done outside of chemistry. > 0: If emissions are on, surface emissions will be done in Smvgear chemistry.
emiss_timpqr	I	1	Emission times per year: 1: one set of emissions per year (yearly) 12: twelve sets of emissions per year (monthly)
emissionSpeciesNames	C*	"	Ordered list of names of species (as a long string) to be read in from the emission file. If a species appears in the file but is not read in, it should be labeled 'xxx'.
emiss_conv_fac	R	1.0	Emission conversion factor when emiss_conv_flag = 1.
emiss_init_val	R	1.0	When emiss_opt = 1, this value will be used to initialize all emissions values.
emiss_infile_name	C*128	''	Emissions input file name.
emiss_var_name	C*32	'emiss'	NetCDF emission variable name.
doReadDailyEmiss	L	F	Should we read the daily emission file?
begDailyEmissRec	I	1	beginning record for daily emission reading
endDailyEmissRec	I	1	ending record for daily emission reading
Harvard biogenic & soil emissions:			
isop_scale()	R	1.0d0	Isoprene scaling factors for each month.
Note that if ((emiss_opt == 2) && do_full_chem), the			

indices below will be automatically set by the setkin files.

iacetone_num	I	0	Const array index for acetone (C3H6O) (ACET).
ico_num	I	0	Const array index for CO.
iisoprene_num	I	0	Const array index for isoprene (C5H8) (ISOP).
ipropene_num	I	0	Const array index for propene (C3H6) (PRPE).
ino_num	I	0	Const array index for NO.
fertscal_infile_name	C*128	'fertscale_4x5_dao.asc'	Fertilizer scale infile name.
lai_infile_name	C*32	'lai_4x5_dao.asc'	Leaf area index infile name.
light_infile_name	C*128	'lighttable.asc'	Light infile name.
precip_infile_name	C*128	'precip_4x5_dao.asc'	Precipitation infile name.
soil_infile_name	C*128	'soiltype.asc'	Soil type infile name.
veg_infile_name	C*128	'vegtype_4x5_dao.asc'	Vegetation type infile name.
isopconv_infile_name	C*128	'isopconvtable.asc'	Isoprene conversion infile name.
monotconv_infile_name	C*128	'monotconvtable.asc'	Monoterpane conversion infile name.

Ship Emission:

do_ShipEmission	L	F	Should we do ship emission calculation?
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Galactic Cosmic Ray:

do_gcr	L	F	Should Galactic Cosmic Ray source of N and NO be turned on?
gcr_infile_name	C*128	''	Input file for Galactic Cosmic Ray source parameters

Michigan aerosol and dust emissions:

emiss_aero_opt	I	0	aerosol emission option 0: no aerosol emission 1: Michigan aerosol emissions 2: GOCART aerosol emissions
naero	I	0	number of aerosol emissions.
emissionAeroSpeciesNames	C*	"	Ordered list of names of aerosol species (as a long string) to be read in from the aerosol emission file.
emiss_aero_infile_name	C*128	''	Name of file containing michigan aerosol emissions.
emiss_dust_opt	I	0	0,1; 0 fo no michigan dust emissions.
emiss_dust_opt	I	0	dust emission option

			0: no dust emission 1: Michigan dust emissions 2: GOCART dust emissions
ndust	I	0	number of dust emissions.
nst_dust	I	1	number of starting point in time for michigan dust emissions.
nt_dust	I	1	number of times of dust emissions per michigan dust emissions file.
emissionDustSpeciesNames	C*	"	Ordered list of names of dust species (as a long string) to be read in from the dust emission file.
emiss_dust_infile_name	C*128	''	Name of file containing michigan dust emissions.
GOCARTerod_infile_name	C*128	"	
GOCARTocean_infile_name	C*128	"	
GOCARTerod_mod_infile_name	C*128	"	

nlGmiChemistry SECTION

chem_opt	I	0	Chemistry option: 0: no chemistry (age of air, etc.) 1: call Radon/Lead chemistry 2: call SmvgearII 3: call simple loss (N2O, etc.) 4: call forcing boundary condition for a tracer (CO2, etc.) 5: call Synoz tracer (if num_species=1 then just Synoz, if num_species=2 then Nodoz tracer is species number 2) 6: call Beryllium chemistry 7: call Quadchem 8: call Sulfur chemistry
chem_cycle	R	1.0	Number of time steps to cycle chemistry calls on: < 1.0: chemistry will subcycle = 1.0: chemistry called each time step
chem_mask_klo	I	k1_gl	Lowest grid level at which chemistry is calculated.
chem_mask_khi	I	k2_gl	Highest grid level at which chemistry is calculated.
loss_opt	I	0	Stratospheric loss option

			0: do not use stratospheric loss 1: use stratospheric loss in gmi_step.F
oz_eq_synoz_opt	I	0	conversion of syzoz to ozone option 0: no conversion 1: do conversion
synoz_threshold	R	Huge	Chemistry turned off where synoz > this threshold (mixing ratio).
t_cloud_ice	R	263.0	Temperature for cloud ice formation.
do_chem_grp	L	F	Should chemical groups be used?
do_smv_reord	L	F	Should the grid boxes be reordered in order of stiffness?
do_wetchem	L	F	Should wet chemistry be done?
Aerosol/Dust Calculations			
For trop and combo without interactive aerosols and chemistry			
AerDust_var_name	C*32	''	netCDF aerosol/dust variable name
AerDust_infile_name	C*128	''	aerosol/dust input file name
do_AerDust_Calc	L	F	Should you do aerosol/dust calculations?
AerDust_Effect_opt	I	0	Radiative effects or/and heterogeneous chemistry 0: rad. effects on and het. chem. on 1: rad. effects off and het. chem. on 2: rad. effects on and het. chem. off 3: rad. effects off and het. chem. off
Be-7/Be-10 chemistry:			
be_opt	I	1	Beryllium star table option: 1: use Koch table for Be-7 and Be-10 2: use Nagai tables for Be-7 and Be-10
t_half_be7	R	53.3d0	Half life of Beryllium-7, or other cosmogenic radionuclide (days).
t_half_be10	R	5.84d8	Half life of Beryllium-10, or other cosmogenic radionuclide (days).
yield_be7	R	4.5d-7	Yield factor for Beryllium-7, or other cosmogenic radionuclide (unitless).
yield_be10	R	2.5d-7	Yield factor for Beryllium-10, or other cosmogenic radionuclide (unitless).
Base forcing boundary condition units = mixing ratio			

forc_bc_opt	I	1	Forcing boundary condition option: 1: set all forc_bc values to forc_bc_init_val 2: read in forc_bc 3: calculate forc_bc
fbc_j1	I	ju1_gl	Forcing boundary condition j1 (low latitude).
fbc_j2	I	j2_gl	Forcing boundary condition j2 (high latitude).
forc_bc_years	I	1	Number of years of forcing data.
forc_bc_start_num	I	1	Forcing boundary condition start number; index for year to use.
forc_bc_kmin	I	1	Minimum k level for forcing boundary condition.
forc_bc_kmax	I	1	Maximum k level for forcing boundary condition.
forcedBcSpeciesNames	C*	"	Ordered list of species names (as a long string) used for forcing boundary condition.
forc_bc_init_val	R	0.0	When forc_bc_opt = 1, this value will be used to initialize all forc_bc values (ppmv).
forc_bc_incrpyr	R	0.3	Forcing boundary condition emission increase per year.
forc_bc_lz_val	R	0.0	Value to which lower zones are forced.
forc_bc_infile_name	C*128	'forc_bc_co2.asc'	Forcing boundary condition input file name.
Base simple loss units = s⁻¹			
loss_freq_opt	I	1	Loss frequency option: 1: set all loss_freq values to loss_init_val 2: read in loss data 3: use NCAR loss
kmin_loss	I	k1_gl	Minimum vertical index at which loss will occur; currently, below this altitude a constant boundary condition is enforced using const_init_val for all species.
kmax_loss	I	k2_gl	Maximum vertical index at which loss will occur.
loss_init_val	R	0.0	When loss_freq_opt = 1, this value will be used to initialize all loss_freq values.
loss_data_infile_name	C*128	'loss_n2o.asc'	Loss data input file name.

Surface Area Density (SAD):			
sad_opt	I	0	Surface area density (SAD) option: 0: do not allocate or process SAD array 1: allocate, but zero out SAD array 2: call Considine code (i.e., Condense) 3: read SAD array from a file of monthly averages
sad_var_name	C*32	'sad'	NetCDF sad variable name.
sad_dim_name	C*32	'sad_dim'	NetCDF sad dimension name.
h2oclim_opt	I	2	Water climatology input option: 1: set all h2oclim values to h2oclim_init_val 2: read in h2oclim
h2oclim_timpqr	I	12	Water climatology times per year 1: yearly 12: monthly
ch4clim_init_val	R	0.0	When h2oclim_opt = 1, this value will be used to initialize all ch4clim
h2oclim_init_val	R	0.0	When h2oclim_opt = 1, this value will be used to initialize all h2oclim values.
h2oclim_infile_name	C*128	''	Water climatology input file name.
lbssad_opt	I	2	Liquid binary sulfate input option: 1: set all lbssad values to lbssad_init_val 2: read in lbssad
lbssad_timpqr	I	12	Liquid binary sulfate times per year: 1: yearly 12: monthly
lbssad_init_val	R	0.0	When lbssad_opt = 1, this value will be used to initialize all lbssad values.
lbssad_infile_name	C*128	''	Liquid binary sulfate input file name.
qk / qqk:			
qk_var_name	C*32	'qk'	NetCDF qk variable name.

qqk_var_name	C*32	'qqk'	NetCDF qqk variable name.
qk_dim_name	C*32	'qk_dim'	NetCDF qk dimension name.
qqk_dim_name	C*32	'qqk_dim'	NetCDF qqk dimension name.
Reaction rate adjustment:			
do_rxnr_adjust	L	F	Adjust reaction rates?
rxnr_adjust_infile_name	C*128	''	Reaction rate adjustment input file name.
rxnr_adjust_var_name	C*32	'reac_rate_adj'	NetCDF reaction rate adjustment variable name.
nlGmiPhotolysis SECTION			
Base photolysis/qj units = s⁻¹			
phot_opt	I	1	Photolysis option: 0: no photolysis 1: set all qj values to qj_init_val 2: read in qj values 3: use a version of fastj (to be used with fastj_opt) 4: lookup table for qj (Kawa style) 5: lookup table for qj (Kawa style) + use ozone climatology for column ozone calc. 6: calculate from table and Gmimod data (Quadchem) 7: read in qj values (2-D, 12 months)
fastj_opt	I	0	fastj option (set together with phot_opt=3): 0: for fastj 1: for fast_JX 2: for fast_JX53b 3: for fast_JX53c
cross_section_file	C*128	''	X-Section quantum yield input file name
rate_file	C*128	''	Master input file name
T_O3_climatology_file	C*128	''	T & O3 climatology input file name
scattering_data_file	C*128	''	Aerosol/cloud scattering data input file name

			Only used for fast_JX53b and fast_JX53c
do_ozone_inFastJX	L	F	Should ozone columns be computed inside fast_JX? By default fast_JX uses the model ozone columns.
do_clear_sky	L	T	Should clear sky photolysis be done?
fastj_offset_sec	R	0.0d0	Offset from model time at which to do fastj (s).
qj_init_val	R	1.0d-30	When phot_opt = 1, this value will be used to initialize all qj values.
qj_infile_name	C*128	' '	qj input file name.
qj_var_name	C*32	'qj'	NetCDF qj variable name.
qqj_var_name	C*32	'qqj'	NetCDF qqj variable name.
qj_dim_name	C*32	'qj_dim'	NetCDF qj dimension name.
qqj_dim_name	C*32	'qqj_dim'	NetCDF qqj dimension name.
Surface albedo:			
sfalbedo_opt	I	0	Surface albedo option: 0: no sfalbedo 1: set each type of sfalbedo to an intial value 2: read in monthly sfalbedo values from a netCDF file 3: read in values of four types of surface albedo from the met data
saldif_init_val	R	0.1	Surface albedo for diffuse light (near IR); when sfalbedo_opt = 1, this value will be used to initialize all saldif values.
saldir_init_val	R	0.1	Surface albedo for direct light (near IR); when sfalbedo_opt = 1, this value will be used to initialize all saldir values.
sasdif_init_val	R	0.1	Surface albedo for diffuse light (uv/vis); when sfalbedo_opt = 1, this value will be used to initialize all sasdif values.
sasdir_init_val	R	0.1	Surface albedo for direct light (uv/vis); when sfalbedo_opt = 1, this value will be used to initialize all sasdir values.
sfalbedo_infile_name	C*128	' '	Surface albedo input file name.
Solar Cycle:			
do_solar_cycle	L	F	Should solar cycle for incoming radiation be turned on?

			(currently works with lookup table only)
sc_infile_name	C*128	''	file for solar cycle coefficients
UV albedo:			
uvalbedo_opt	I	0	UV albedo option: 0: no uvalbedo 1: set all uvalbedo values to uvalbedo_init_val 2: read in monthly uvalbedo values from an ASCII file 3: read in bulk surface albedo values from the met data
uvalbedo_init_val	R	0.1	When uvalbedo_opt = 1, this value will be used to initialize all uvalbedo values.
uvalbedo_infile_name	C*128	''	Uvalbedo input file name.
nlGmiTracer SECTION			
tracer_opt	I	0	Tracer run option: 0: no tracer 1: tracer run
efold_time	R	0.0	e-folding time of the tracer (in days)
tr_source_land	R	0.0	land source for the tracer
tr_source_ocean	R	0.0	ocean source for the tracer
nlGmiLightning SECTION			
lightning_opt	I	0	Lightning option: 0: lightning NO emissions read from file 1: parameterized lightning 2: no lightning
i_no_lgt	I	0	Index to the location of NO_lgt in the emiss infile
desired_g_N_prod_rate	R	5.0	global nitrogen production rate (in Tg.)

Table 1: Namelist variables